

AEC

UNITED STATES  
ATOMIC ENERGY COMMISSION  
Washington 25, D. C.

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FOR IMMEDIATE RELEASE  
(Monday, July 24, 1961)

AEC AUTHORIZES START-UP AND TESTING  
OF N.S. SAVANNAH'S REACTOR

The Atomic Energy Commission today authorized, subject to certain conditions, fueling, start-up and operation of the reactor of the N. S. Savannah, the world's first nuclear cargo-passenger ship, for test and demonstration purposes at Camden, New Jersey, and Yorktown, Virginia, and for initial sea trials of the vessel.

The authorization was contained in a Memorandum and Authorization signed by Chairman Glenn T. Seaborg and Commissioners John S. Graham and Loren K. Olson and announced today by Dr. Seaborg. Commissioner Leland Haworth was absent from Washington on official business on the date of adoption of, but previously had approved, the Memorandum and Authorization. Commissioner Robert E. Wilson did not participate in the Commission authorization because of his absence from the country on official business.

Construction of the Savannah was authorized by Congress in 1956, as a joint project of the U. S. Atomic Energy Commission and the Maritime Administration of the U. S. Department of Commerce. The primary purpose in building the Savannah has been to produce a prototype vessel which would serve as a forerunner of other commercial nuclear vessels and as a test facility to permit the development of improved components and techniques for nuclear ship operation.

Under a memorandum of understanding between the AEC and the Maritime Administration, the Commission was assigned the development of the Savannah's nuclear power plant and the Maritime Administration was assigned the design and construction of the ship and its operation. The memorandum established a Maritime Administration-Atomic Energy Commission Joint Group to carry out tasks related to design, development, testing and operation of the ship.

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The Savannah is now at the yards of its builder, the New York Shipbuilding Corporation, Camden, New Jersey.

Although the Savannah will not be subject until later to the Commission's licensing requirements, the Commission has applied the same standards to the review of the nuclear safety aspects of the vessel's construction and operation as are applied in the review of licensed reactors. This review has been conducted by the Commission's Division of Licensing and Regulation and Division of Compliance and by the Advisory Committee on Reactor Safeguards.

The action of the Commission covers five phases of testing and initial operation of the Savannah. These are tests to determine the adequacy of construction and installation of machinery, components, wiring and piping (Phase I); a "dummy run" in which all reactor systems were operated concurrently without the use of nuclear fuel (Phase II); loading of fuel elements and concurrent testing at the shipyard of the New York Shipbuilding Corporation (Phase III); progression from zero power to operation at not more than 10 per cent full power at the Camden location and, after transfer of the ship with the reactor shut down from Camden to a site on the York River near Yorktown, Virginia, completion of dock trials up to full power (Phase IV); and sea trials off Virginia by the builder with Yorktown as an operating base (Phase V). The Commission's review did not cover Phase VI, consisting of extended sea trials, to be conducted by States Marine Lines, Inc., of New York, as general agent of the Maritime Administration.

On December 27, 1960, the Commission gave notice that a non-adjudicatory public hearing would be held to consider whether there was reasonable assurance that the Savannah nuclear power plant could be safely fueled and operated for test and demonstration purposes, at one or more locations, in accordance with the procedures set forth in the Final Safeguards Report for the vessel. Extensive public hearings were held March 6-8 and April 12, 1961 and on June 9, 1961, the Hearing Examiner submitted a recommended report that, subject to certain conditions, the Savannah be fueled and operated for test and demonstration purposes and for the initial sea trials.

In their Memorandum and Authorization, the Commissioners declared:

"After review of the record of this proceeding and considering the findings in the presiding officer's recommended report, we have concluded that there is reasonable assurance that the N. S. Savannah nuclear power plant may be

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safely fueled and operated through the initial sea trials by the New York Shipbuilding Corporation.

"The Commission hereby issues an authorization to permit the New York Shipbuilding Corporation to load nuclear fuel into the N. S. Savannah reactor and to conduct test operations at the Camden, New Jersey, and Yorktown, Virginia, sites through initial sea trials, this authorization being subject to the following conditions."

Among the conditions set forth by the Commissioners were these:

1. The Joint Group is required to file in the record of the Savannah hearing a statement that adequate, complete, and detailed written operating procedures and written maintenance procedures have been prepared for each phase of test operation of the Savannah's nuclear power plant in advance of each phase of the program.
2. In order to facilitate continuing regulatory review, the Joint Group is directed to prepare, or have prepared, technical specifications for all systems of the Savannah which affect the nuclear safety of the ship.
3. Before the loading of nuclear fuel into the reactor, the Commission's Division of Licensing and Regulation and Division of Compliance are required to review test results under Phase II.
4. Before test operations at Yorktown, Virginia, in excess of 10 per cent full power, the Commission's Division of Licensing and Regulation and Division of Compliance and the Advisory Committee on Reactor Safeguards are required to conduct a further review of all tests to date.
5. Upon completion of initial sea trials, a further review of all reports on test operations is to be made by the Commission's Division of Licensing and Regulation and by the Advisory Committee on Reactor Safeguards and submitted to the Commission after which the matter shall be set down for public hearing.
6. The Commissioners' authorization does not extend to the use of the barge Atomic Servant for the handling of any radioactive material; the replacement of Core I with Core II; replacement of the present control rod drive system; extended sea trials of the Savannah; and licensing of the ship's reactor after Phase VI.

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The Savannah, named for the S. S. Savannah, first steamship to cross the Atlantic Ocean, is equipped with a pressurized water reactor manufactured by Babcock & Wilcox Company, of New York. Its uranium oxide fuel, enriched to 4.4 per cent in uranium 235, is expected to provide power to operate the ship for 3½ years, or 300,000 nautical miles, without replacement. The reactor has a power rating of approximately 70 thermal kilowatts. After completion of the test program at Camden at 10 per cent of its reactor power, the Savannah will move to Yorktown under steam furnished by temporary oil-fired boilers located in a cargo hold of the ship.

The Savannah is essentially a sheltered deck vessel with a modified Mariner hull. The ship is capable of carrying 60 passengers, a crew of approximately 110 and about 10,000 tons of dry cargo at a sustained sea speed of 20.25 knots. The vessel was designed by George G. Sharp, Inc. of New York.

The keel of the Savannah was laid on May 22, 1958, and the vessel was launched on July 21, 1959. Basic ship costs, including the ship's nuclear propulsion system, were \$35.6 million. Construction support, including first core cost, spare nuclear parts, pre-critical tests and trials, crew training and administrative costs, total \$11.3 million.